Geophysical Research Abstracts
Vol. 14, EGU2012-13803, 2012
EGU General Assembly 2012

The effect of ozone and aerosols on the surface erythemal UV radiation estimated from OMI measurements

J. Lee, S. Lee, Y. Hong, C. Song, W. Choi, D. Kim, S. Kim, and J. Hong
National Institute of Environmetal Research, Republic Of Korea (joonsuklee@korea.kr)

Surface erythemal UV radiation is mainly affected by total column ozone, aerosols, clouds, and solar zenith angle. The effect of ozone on the surface UV radiation has been explored many times in the previous studies due to the decrease of ozone layer. In this study, we calculated the effect of aerosols on the surface UV radiation as well as that of ozone using data acquired from Ozone Monitoring Instrument (OMI). First, ozone, aerosol optical depth (AOD), and surface erythemal UVB radiation measured from satellite are compared with those from ground measurements. The results showed that the comparison for ozone was good with r^2 of 0.92. For aerosol, there was difference between satellite measurements and surface measurements due to the insufficient information on aerosol in the retrieval algorithm. The r^2 for surface erythemal UV radiation was high ($\sim$0.93) but satellite measurements showed about 30% larger values than surface measurements on average by not considering the effect of absorbing aerosols in the lower atmosphere in the retrieval process from satellite measurements. Radiative amplification factor (RAF) is used to access the effect of ozone and aerosol quantitatively. RAF for ozone was 0.97$\sim$1.49 with solar zenith angle. To evaluate the effect of aerosol on the surface UV radiation, only clear-sky pixel data were used and solar zenith angle and total column amount of ozone were fixed. Also, RAF for aerosol was assessed according to the single scattering albedo (SSA) of aerosols. The results showed that RAF for aerosol with smaller SSA (< 0.90) was larger than that for with larger SSA (> 0.90). The RAF for aerosol was 0.02 $\sim$ 0.08 for the given conditions which is relatively small compared to that for ozone. However, considering the fact that aerosol optical depth can change largely in time and space while the total column amount of ozone does not change very much, it needs to include the effect of aerosol to predict the variations of surface UV radiation more correctly.